



## Priority, Market-Ready Technologies and Innovations

# ITS Technologies in Work Zones

### **Problem: Work zones exacerbate growing highway congestion and safety concerns**

With the National Highway System essentially complete, and many roads surpassing their useful design life, the focus of roadwork has shifted from new construction to rehabilitating and improving existing facilities. The share of capital funds used for system preservation rose from 47.6 percent in 1997 to 52.0 percent in 2000. As a result of this trend, transportation agencies must perform a greater number of projects on roads carrying traffic.

As vehicle travel continues to increase significantly faster than roadway miles, work zones exacerbate the growing congestion problem. Between 1980 and 2000, roadway lane miles increased 3.8 percent, while vehicle miles of travel grew 80 percent. From 1982 to 1999, "rush hour" increased from 2–3 hours to 5–6 hours a day. The time window for working on roadways without severely affecting traffic is getting smaller.

#### **Putting It in Perspective**

- Work zones account for nearly 24 percent of non-recurring congestion, or 482 million vehicle-hours of delay.
- In 2002, work zone fatalities reached a high of 1,181.
- More than 40,000 people are injured in work zone-related crashes each year.

### **Solution: Intelligent Transportation Systems (ITS) technologies improve traffic flow and increase safety in work zones**

ITS technologies increasingly are being used to anticipate and mitigate congestion caused by highway work zones. These technologies provide ways to better monitor and manage traffic flow through work zones and increase safety for both workers and road users. By easing congestion and improving traffic flow, ITS technologies can reduce construction time and costs. ITS technologies also improve incident detection, response, and clearance in work zones; this is particularly important because traffic capacity often is reduced in work zones, and incidents in these areas cause even greater congestion and increase the potential for secondary crashes.

#### ***What are some examples of ITS technologies used in work zones?***

ITS technologies are used in a variety of applications. For example, dynamic lane merge systems facilitate efficient and safe traffic merging as vehicles approach work zone lane closures. Speed advisory systems detect and display the speed of approaching vehicles to encourage drivers to slow down. Variable speed limit (VSL) systems detect occupancy, speed, and weather; the data are analyzed by a virtual traffic management center or field unit that uses the information to establish and display a condition-responsive speed limit on signs based on preprogrammed criteria. The data also helps provide real-time information to motorists through changeable message signs, Web sites, and traveler advisory radio alerts.

### **Successful Applications: Tackling work zone mobility and safety issues with ITS**

Using a mobile traffic monitoring system on a full closure of U.S. Interstate 496 (I-496) in Lansing, MI helped the Michigan Department of Transportation (DOT):

- Identify and respond to incidents quickly, thereby minimizing the impact on traffic.
- Provide real-time information on problem areas to travelers.
- Communicate more effectively with local agencies.

The Illinois DOT used a portable traffic monitoring and information dissemination system to support bridge reconstruction activities on a busy section of I-55 near Springfield, IL. Benefits of using the system included:

- No significant backups.
- Fewer traffic citations in the work zone (dynamic information on the number of citations issued to date was posted upstream of the work zone).
- Only two crashes in the work zone over the first five months—one attributed to fatigue and the other to alcohol.

In 2002, the North Carolina Department of Transportation (NCDOT) deployed its first smart work zone during roadwork on I-95 just north of Fayetteville. Sensors collected traffic data and analyzed the data to estimate delay. When delay surpassed a pre-set threshold, the system automatically displayed alternate route information on electronic signs. Traffic condition information was also displayed on a Web site. Before the system was installed, whenever there were lane closures queues approaching the work zone were often several miles long and sometimes exceeded five miles. After the system began operating, the queues decreased to generally two miles or less. NCDOT noted that there were no fatalities associated with this work zone and fewer crashes as compared to previous I-95 road projects without ITS.

### **Benefits**

- Ensures more efficient traffic flow.
- Increases safety for workers and road users.
- Provides real-time information to motorists.
- Reduces crashes and traffic delays.

### **Additional Resources**

FHWA is working with State and local partners to sponsor "Making Work Zones Work Better" workshops. Information on the workshops is available at <http://ops.fhwa.dot.gov/wz/workshops/workshops.htm>.

The *Work Zone Best Practices Guidebook* covers success stories and lessons learned on topics such as ITS. Information on the guidebook is available at <http://ops.fhwa.dot.gov/wz/practices/best/bestpractices.htm>.

For more information about ITS work zone technologies, visit <http://ops.fhwa.dot.gov/wz/technologies/its.htm>.

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